QDSP-2020

Fan-less Box PC with Intel® Atom N270 Processor

User's Guide

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Quanmax reserves the right to make changes without notice in product or component design as warranted by evolution in user needs or progress in engineering or manufacturing technology. Changes which affect the operation of the unit will be documented in the next revision of this user's guide.

Revision	Date	Edited by	Changes
1.0	11/13/2008	SLee	Initial Release

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Safety Instructions

■ Before You Begin

Before handling the product, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety. Refer to the “Advisories” section in the Preface for advisory conventions used in this user’s guide, including the distinction between Warnings, Cautions, Important Notes, and Notes.

- Always use caution when handling/operating a computer. Only qualified, experienced, authorized electronics service personnel should access the interior of a computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.
- Use extreme caution when installing or removing components. Refer to the installation instructions in this user’s guide for precautions and procedures. If you have any questions, please contact Quanmax Post-Sales Technical Support.

WARNING

High voltages are present inside the chassis when the unit’s power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

■ When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

1. Turn off the computer and any peripherals.
2. Disconnect the computer and peripherals from their power sources or subsystems to prevent electric shock or system board damage. This does not apply when hot swapping parts.
3. Follow the guidelines provided in “Preventing Electrostatic Discharge” on the

following page.

4. Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

CAUTION

Do not attempt to service the system yourself except as explained in this user's guide. Follow installation and troubleshooting instructions closely.

■ Preventing Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Quanmax strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded. This will discharge any static electricity that may have built up in your body.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.

- Do not handle or store system boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.

■ Instructions for Lithium Battery

WARNING

Danger of explosion when battery is replaced with incorrect type. Only replace with the same or equivalent type recommended by the manufacturer.

Do not dispose of lithium batteries in domestic waste. Dispose of the battery according to the local regulations dealing with the disposal of these special materials (e.g. to the collecting points for disposal of batteries

■ Voltage Ratings

The external power adaptor of the QDSP-2020 has the following voltage ratings:

- Input: 100-240 VAC
- Output: 50W, +12VDC, 4.16A max

Preface

■ How to Use This Guide

This guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

NOTE

Driver downloads and additional information are available under Downloads on our web site: www.quanmax.com.

■ Unpacking

When unpacking, follow these steps:

1. After opening the box, save it and the packing material for possible future shipment.
2. Remove all items from the box. If any items listed on the purchase order are missing, notify Quanmax customer service immediately.
3. Inspect the product for damage. If there is damage, notify Quanmax customer service immediately. Refer to “Warranty Policy” for the return procedure.

■ Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices.

FCC Compliance Statement for Class A Devices

The product(s) described in this user’s guide has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user’s guide, may cause harmful interference to radio communications. Operation of this equipment in a residential

area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

Changes or modifications not expressly approved by Quanmax could void the user's authority to operate the equipment.

NOTE

The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interference or to be noncompliant with the appropriate standards for its intended use.

■ Warranty Policy

Limited Warranty

Quanmax Inc.'s detailed Limited Warranty policy can be found under Support at www.quanmax.com. Please consult your distributor for warranty verification.
The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Quanmax or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Quanmax or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's guide.
No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever.
Quanmax reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

Return Procedure

For any Limited Warranty return, please contact Support at www.quanmax.com and login to obtain a Return Material Authorization (RMA) Number. If you do not have an account, send an email to support@quanmax.com to apply for one.
All product(s) returned to Quanmax for service or credit must be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items must be prepaid by the customer who is responsible for any loss or damage caused by

common carrier in transit. Returns for Warranty must include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing the date of purchase.
To reduce risk of damage, returns of product must be in a Quanmax shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Quanmax Customer Service at a nominal cost.
Quanmax owns all parts removed from repaired products. Quanmax uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Quanmax repairs or replaces a product, its warranty term is not extended.
Shipments not in compliance with this Limited Warranty Return Policy will not be accepted by Quanmax.

Limitation of Liability

In no event shall Quanmax be liable for any defect in hardware, software, loss, or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Quanmax's liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Quanmax or its authorized agent.

■ Maintaining Your Computer

Cleaning Components

Internal fans cool the computer by drawing in air through air vents in the front of the computer and blowing it out the rear-side panels. Dust and other debris is drawn in with the air and, if allowed to build up, will interfere with the operation of various system components and insulate components, preventing heat from dissipating. To prevent this, an air filter has been installed in front of the air vents in the front panel to block dust and other debris from entering the computer.
Dust and debris builds up on the air filter over time. When the air filter becomes very dirty, it is difficult for cooling air to pass through the air filter and enter the computer. So, the air filter must be cleaned to prevent the computer from overheating. Remove and clean the air filter on a regular basis following the steps described in the "Air Filter" section of Chapter 2. Also, regularly vacuum the exterior of the chassis to remove dust that has accumulated around the air vents.

Environmental Factors

- **Temperature**

  The ambient temperature within an enclosure may be greater than room ambient temperature. Installation in an enclosure should be such that the amount of air flow required for safe operation is not compromised. Consideration should be given to the maximum rated ambient temperature. Overheating can cause a variety of problems, including premature aging and failure of chips or mechanical failure of devices.

  If the system has been exposed to abnormally cold temperatures, allow a two-hour warm-up period to bring it up to normal operating temperature before turning it on. Failure to do so may cause damage to internal components, particularly the hard disk drive.

- **Humidity**

  High-humidity can cause moisture to enter and accumulate in the system. This moisture can cause corrosion of internal components and degrade such properties as electrical resistance and thermal conductivity. Extreme moisture buildup inside the system can result in electrical shorts, which can cause serious damage to the system.

  Buildings in which climate is controlled usually maintain an acceptable level of humidity for system equipment. However, if a system is located in an unusually humid location, a dehumidifier can be used to maintain the humidity within an acceptable range. Refer to the “Specifications” section of this user’s guide for the operating and storage humidity specifications.

- **Altitude**

  Operating a system at a high altitude (low pressure) reduces the efficiency of the cooling fans to cool the system. This can cause electrical problems related to arcing and corona effects. This condition can also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency.

Power Protection

The greatest threats to a system’s supply of power are power loss, power spikes, and power surges caused by electrical storms, which interrupt system operation and/or damage system components. To protect your system, always properly ground power cables and one of the following devices.

- **Surge Protector**

  Surge protectors are available in a variety of types and usually provide a level of protection proportional with the cost of the device. Surge protectors prevent voltage spikes from entering a system through the AC power cord. Surge protectors, however, do not offer protection against brownouts, which occur when the voltage drops more than 20 percent below the normal AC line voltage level.

- **Line Conditioner**

  Line conditioners go beyond the overvoltage protection of surge protectors. Line conditioners keep a system's AC power source voltage at a fairly constant level and, therefore, can handle brownouts. Because of this added protection, line conditioners cost more than surge protectors. However, line conditioners cannot protect against a complete loss of power.

- **Uninterruptible Power Supply**

  Uninterruptible power supply (UPS) systems offer the most complete protection against variations on power because they use battery power to keep the server running when AC power is lost. The battery is charged by the AC power while it is available, so when AC power is lost, the battery can provide power to the system for a limited amount of time, depending on the UPS system.
  UPS systems range in price from a few hundred dollars to several thousand dollars, with the more expensive unit s allowing you to run larger systems for a longer period of time when AC power is lost. UPS systems that provide only 5 minutes of battery power let you conduct an orderly shutdown of the system, but are not intended to provide continued operation. Surge protectors should be used with all UPS systems, and the UPS system should be Underwriters Laboratories (UL) safety approved.

Chapter 1

Introduction

■ Overview

The QDSP-2020 is a compact Fan-less Box PC ideal for space critical applications. This embedded hardware platform is based on a 3.5” industrial SBC with Intel® Atom N270 Processor, 945GSE/ ICH7-M chipset, and DDR2 533 SO-DIMM up to 2 GB. Featured are a 2.5” SATA hard drive bay, Internal Compact Flash Type II slot, DVI-I, USB 2.0, VGA, COM (RS-232), and PS/2 KB/MS.
The QDSP-2020 provides high reliability for harsh environments, compact size, noise-less operation and is highly suited to a wide range of industrial applications such as Digital Signage, Gaming, Transportation, Surveillance, and Thin Servers.

Checklist

- AC/DC adapter * 1
- Power cord * 1
- PS/2 Y cable * 1
- WALL-MOUNT bracket * 1set (2pcs)
- Screws for wall-mount bracket (1 pack)
- Wireless Antenna * 1 (optional)
- Driver CD * 1
- Quick Installation Guide * 1

Features

- Fan-less design and compact size
- 3.5” embedded SBC
  Intel® Atom Processor N270
  Intel® 945GSE / ICH7-M, DDR2-533 SO-DIMM up to 2 GB
- USB 2.0, GbE, COM, DVI-I, AC’97 Audio
- 1x 2.5" SATA hard drive bay
- Rugged aluminum chassis with integrated cooling solution

■ Product Specifications

Construction
Aluminum extrusion, heavy-duty steel chassis
System Board
3.5" Embedded SBC, Intel® Atom Processor N270, 945GSE / ICH7-M Chipset
Memory
1x DDR2-533 SO-DIMM up to 2 GB
I/O Panel
Front I/O panel 1x Power LED 1x HDD Active LED 2x USB 2.0 1x Power Switch Button Rear I/O panel 1x KB / MS (mini-DIN) 1x COM (D-sub 9 Pins) 1x DVI port 1x 10/100/1000 LAN port (RJ45) 2x USB ports Audio ports (AC'97) DC-12V IN Antenna Connector (Option)
Drive Bays
1x 2.5" Hard Drive Bay (SATA)
Expansion
1x Internal CompactFlash Type II Slot
WLAN
IEEE 802.11b/g (optional)
Power Supply
Input: 100-240 VAC Output: 50W, +12VDC, 4.16A max
Cooling
Fanless and Internal Heat Pipes
Shock
Operating: 10 g / 11ms; Storage: 30 g / 11ms (half-sine)
Vibration
Operating (IEC 68-2-64 Fh): 5-500Hz, 1 g (rms) / 3-axes Storage (IEC 68-2-6 Fc): 5-500Hz, 2 g (rms) / 3-axes
Temperature / Humidity
Operating: 0°C to 45°C, 0%-90%, non-condensing Storage: -20°C to 80°C, 0%-90%, non-condensing
Dimensions
216 x 60 x 200 mm (WxHxD)
Weight
2.8 kg
Mounting
Wall-mount
Certifications
CE, FCC Class A

Table 1 QDSP-2020 product specifications

■ Mechanical Layout

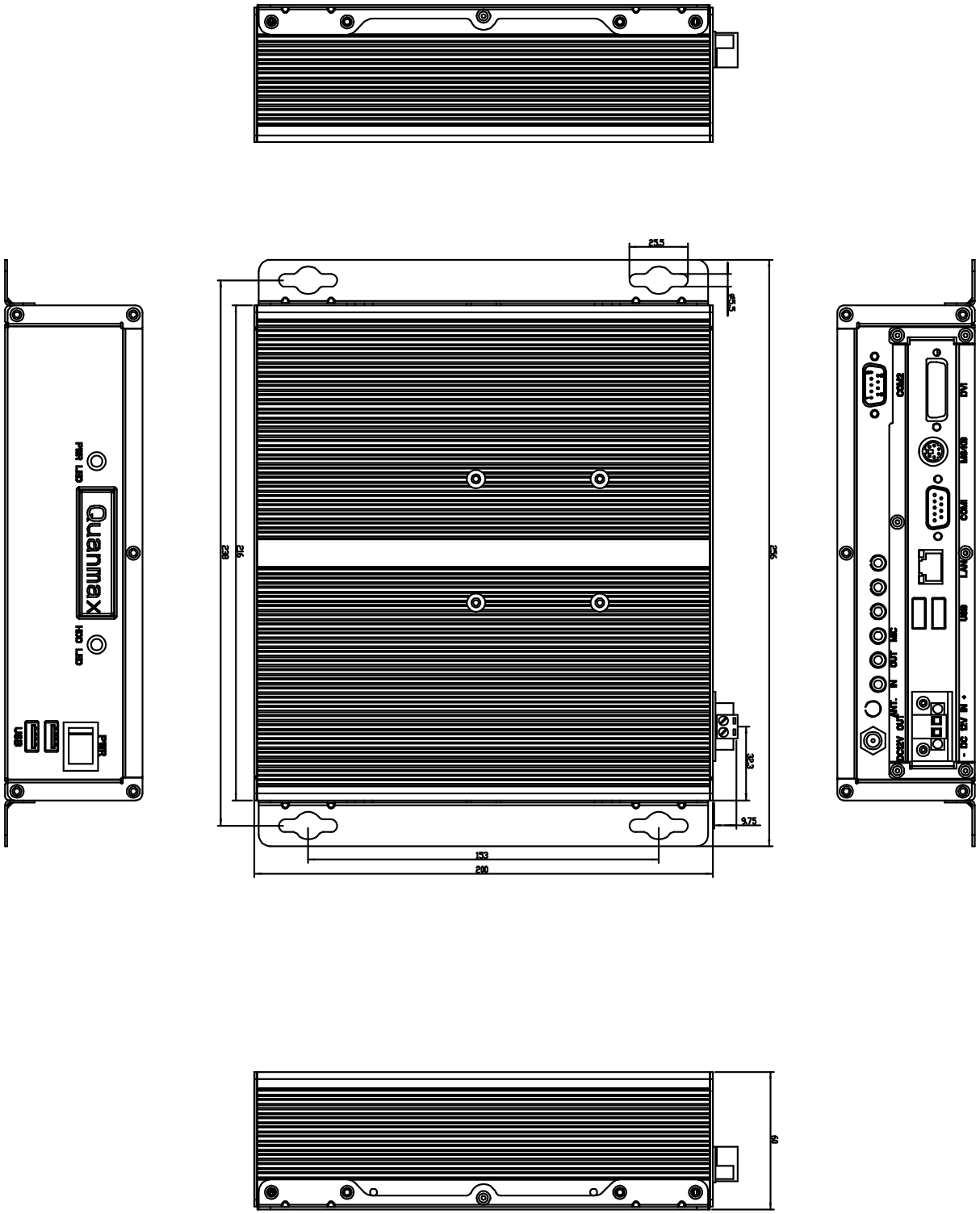


Figure 1 Mechanical Dimensions

Chapter 2

Assembly/Disassembly

■ Accessing Internal Components

WARNING

Before opening your system, make sure to turn it off and disconnect the power sources to prevent electric shock or system damage.

Follow the procedure described below to access the system's internal components

1. Loosen the 10 flathead screws from the front and rear panels and the flathead screws from each side.
2. Loosen the 4 roundhead screws from top of the chassis cover.
3. Lift the chassis cover up and off of the chassis base. See figure below for the locations of the internal components of the system.

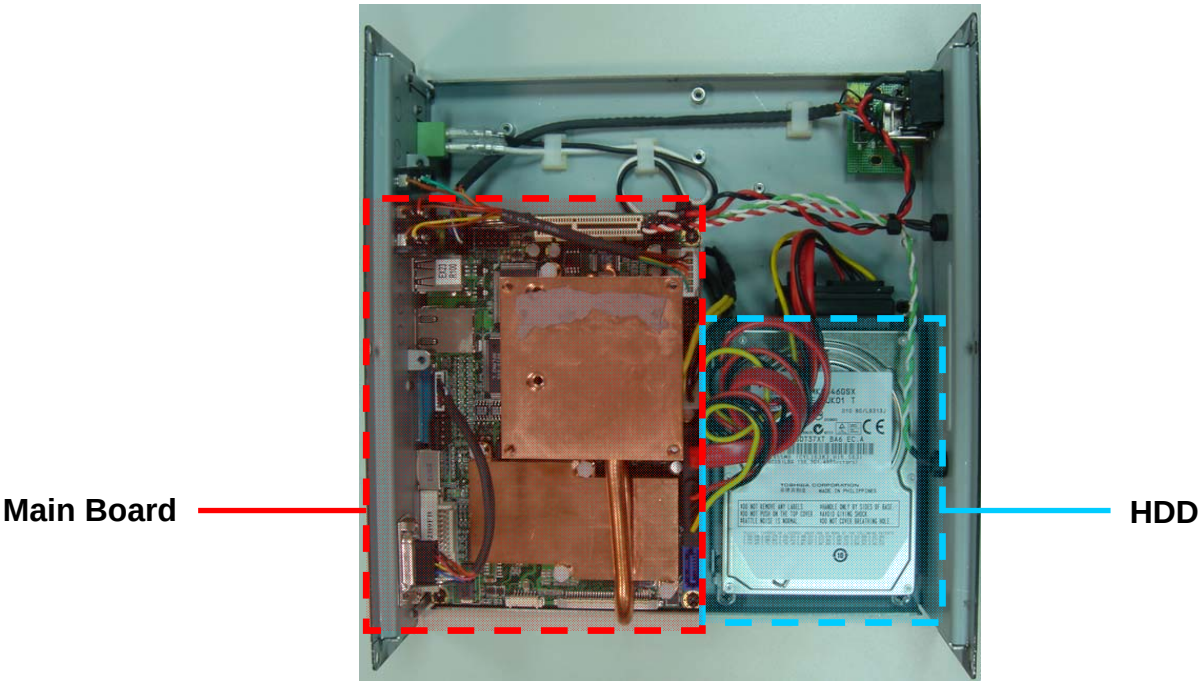


Figure 2 Mechanical Layout - Internal Components

■ Installing a Memory Module

Remove the chassis bottom cover

Loosen one flathead screws and remove the chassis bottom cover

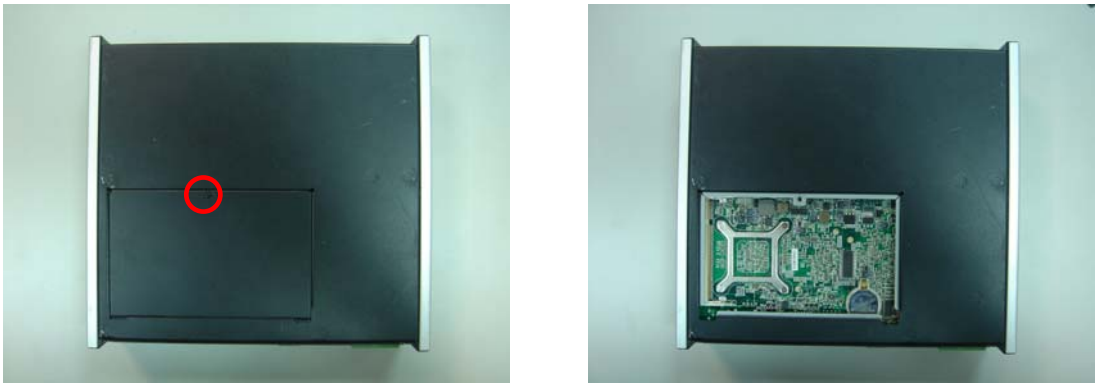


Figure 3 Remove chassis bottom cover

Installing a SO-DIMM

1. To avoid generating static electricity and damaging the SO-DIMM, ground yourself by touching a grounded metal surface or use a ground strap before you touch the SO-DIMM.
2. Do not touch the connectors of the SO-DIMM. Dirt or other residue may cause a malfunction.
3. Hold the SO-DIMM with its notch aligned with the memory socket of the QDSP-2020 and insert it at a 30-degree angle into the socket.

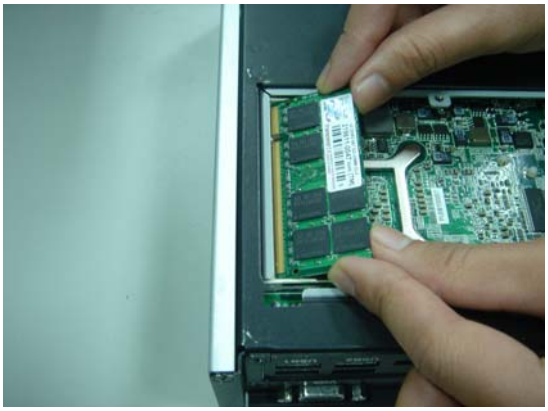


Figure 4 Align the SO-DIMM Memory Module with the onboard socket

4. Fully insert the module into the socket until a “click” is heard.

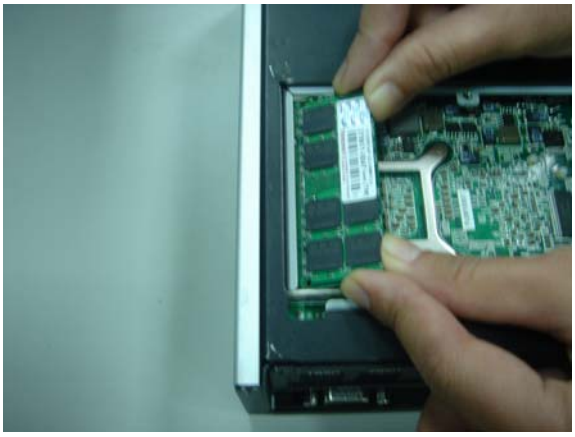


Figure 5 Fully insert the SO-DIMM Memory Module into the onboard socket

5. Press down on the SO-DIMM so that the tabs of the socket lock on both sides of the module.

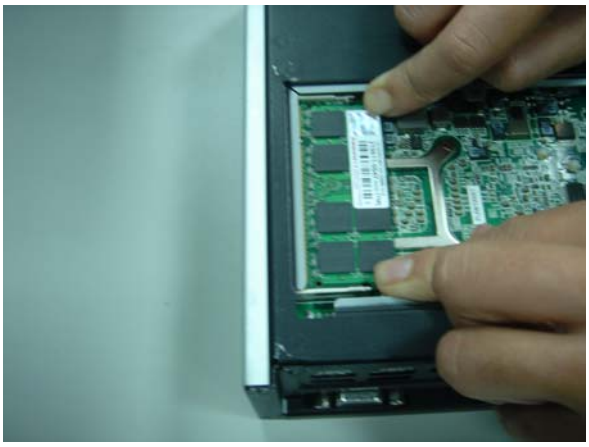


Figure 6 Press down on the SO-DIMM Memory Module to lock it in place

6. Replace the chassis bottom cover as described above.

Wall Mounting

The QDSP-2020 comes with 2 L-brackets for wall mounting. Secure the L-brackets to the each side of the chassis using the total 8 screws.

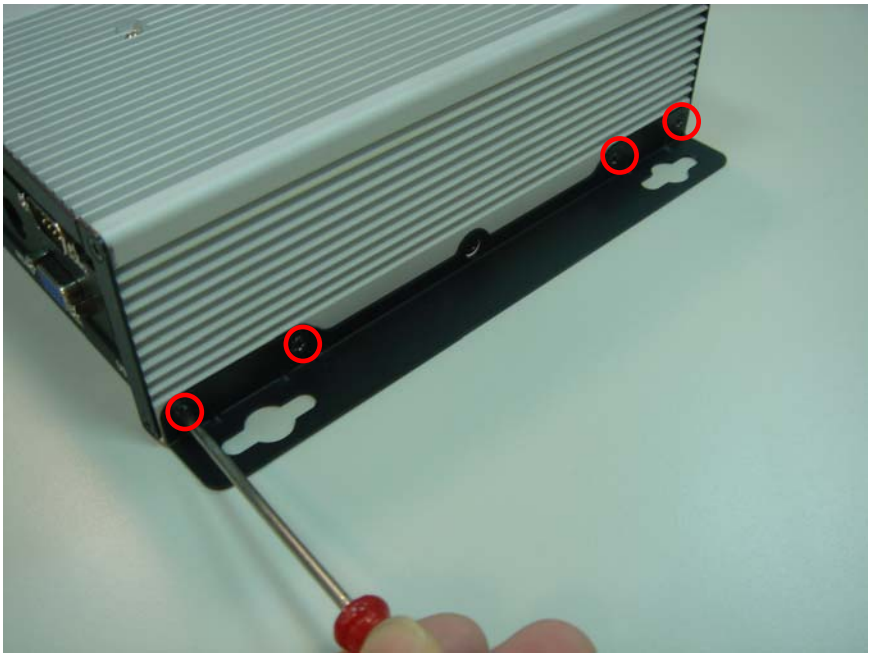


Figure 7 Secure the L-brackets for wall mounting

Refer to figure below for wall mount holes spacing. The shape of the screw holes allows the QDSP-2020 to be mounted with the Front Panel facing in any orientation, and provides for easy removal of the chassis for repair of maintenance. Use standard M5 screws to mount the QDSP-2020.

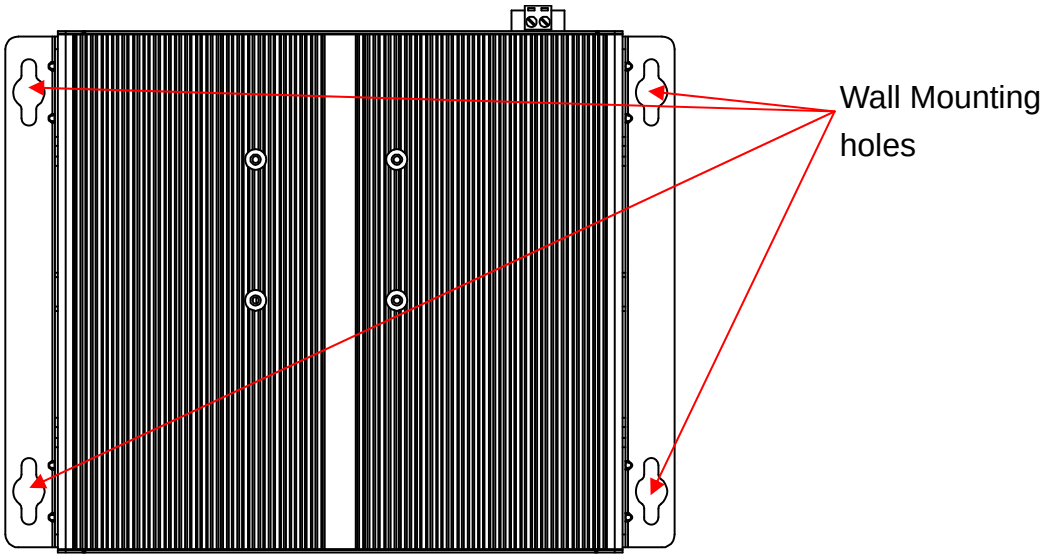


Figure 8 Wall mount holes spacing

Chapter 3

Getting Started

■ Power Connection

DC Power

1. Make sure the power distribution to the DC power feed wires is disconnected.
2. Loosen the screws securing the terminal block to the DC inlet as shown and remove it from the chassis.

Figure 9 Loosen screws securing DC terminal block and remove from chassis

3. Remove just enough insulator material from the ends of the wires to allow a proper electrical connection to the terminal block.
4. Insert the power feed wires into the terminal block and tighten the compression clamps as shown. Insert the terminal block into the DC inlet in the chassis and secure by tightening the screws loosened in Step 2.

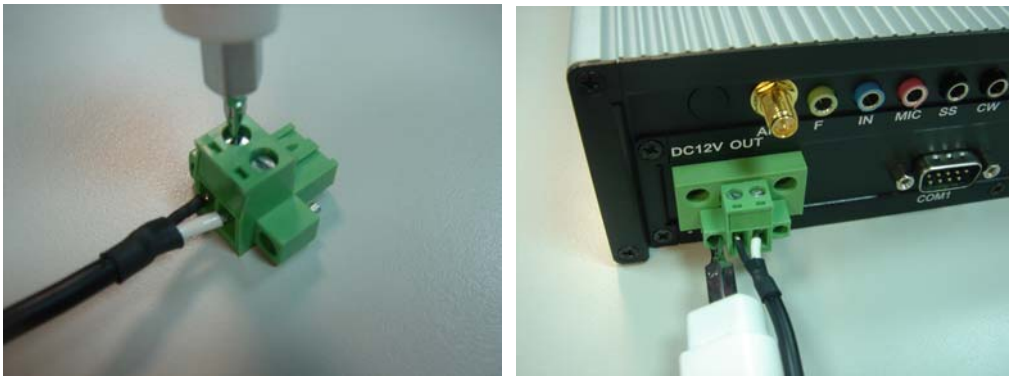


Figure 10 Tighten the terminal block compression clamps, insert into the DC inlet and secure

5. Connect the power distribution to the DC power feed wires.

CAUTION

Use the power cord suitable for the power supply in your country. Do not remove or alter the grounding prong on the power cord. In situations where a two-slot receptacle is present, have it replaced with a properly grounded three-prong grounding type receptacle.

■ Operating System and Drivers

If your product does not come with an operating system pre-installed, you will need to install an operating system and the necessary drivers to operate it. After you have finished assembling your system and connected the appropriate power source, power it up using the power switch and install the desired operating system.
You can download the drivers for the product from the Quanmax website at www.quanmax.com and install as instructed there. For other operating systems, please contact Quanmax.

Chapter 4

Maintenance and Prevention

Your QDSP-2020 system requires minimal maintenance and care to keep it operating correctly.

- Occasionally wipe the system with a soft dry cloth.
- You should only remove persistent dirt by use of a soft, slightly damp cloth (use only a mild detergent).
- Make sure the ventilation holes are clear of debris.

Chapter 5

Interface

■ External Connectors

Rear I/O Panel

Connector	Function
USB	USB2.0 Type A Connector
LAN	10/100/1000 Ethernet RJ-45 Connector
COM1	RS-232/422/485 Port DB-9 Connector
COM2	RS-232 Port DB-9 Connector
MS/KB	PS/2 KB/MS Mini-DIN Connector
DVI	DVI-I Connector
Audio	Audio IN, Audio Out, MIC

Table 2 Rear panel connectors description

PIN	SIGNAL	PIN	SIGNAL
1	+5V	5	+5V
2	USB1-	6	USB0-
3	USB1+	7	USB0+
4	GND	8	GND

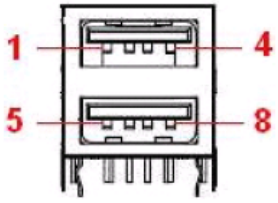
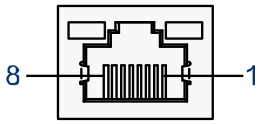
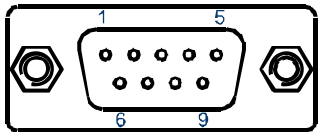


Table 3 USB2.0 Type A connector (USB)



Pin	Signal
1	Tx+
2	Tx-
3	Rx+
4	NC
5	NC
6	Rx-
7	NC
8	NC

Table 4 10/100/1000 Ethernet RJ-45 Connector (LAN)



Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

Table 5 RS-232/422/485 Port DB-9 Connector (COM1)

PIN	SIGNAL
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

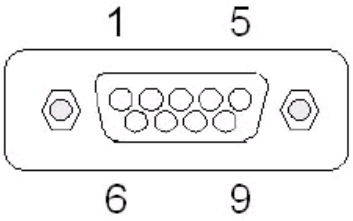
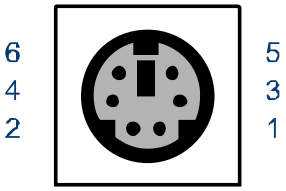
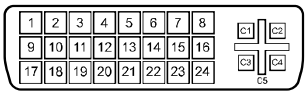


Table 6 RS-232 Port DB-9 Connector (COM2)



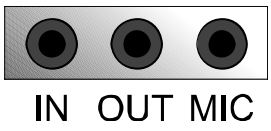
Pin	Signal
1	KBDAT
2	MSDAT
3	GND
4	+5V
5	KBCLK
6	MSCLK

Table 7 PS/2 KB/MS Mini-DIN Connector (MS/KB)



Pin	Signal Name	Pin	Signal Name
1	TX2N	2	TX2P
3	GND	4	TX5N
5	TX5P	6	SD_CLK
7	SD_DATA	8	VSYNC
9	TX1N	10	TX1P
11	GND	12	TX4N
13	TX4P	14	VGA_PWR
15	VGA_EN	16	HPD
17	TX0N	18	TX0P
19	GND	20	TX6N
21	TX6P	22	GND
23	TCLP	24	TXLN

Table 8 DVI-I Connector (DVI)

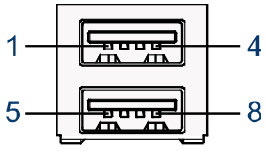


Connector	Function
MIC	MIC In
OUT	LINE Out
IN	LINE In

Table 9 Audio Connectors (Audio)

Front I/O Panel

USB2.0 Type A Connector



Pin	Signal Name	Pin	Signal Name
1	+5V	5	+5V
2	USB1-	6	USB0-
3	USB1+	7	USB0+
4	GND	8	GND

Internal Jumpers

Jumper Settings

To ensure correct system configuration, the following section describes how to set the jumpers to enable/ disable or change functions. For jumper descriptions, please refer to the table below.

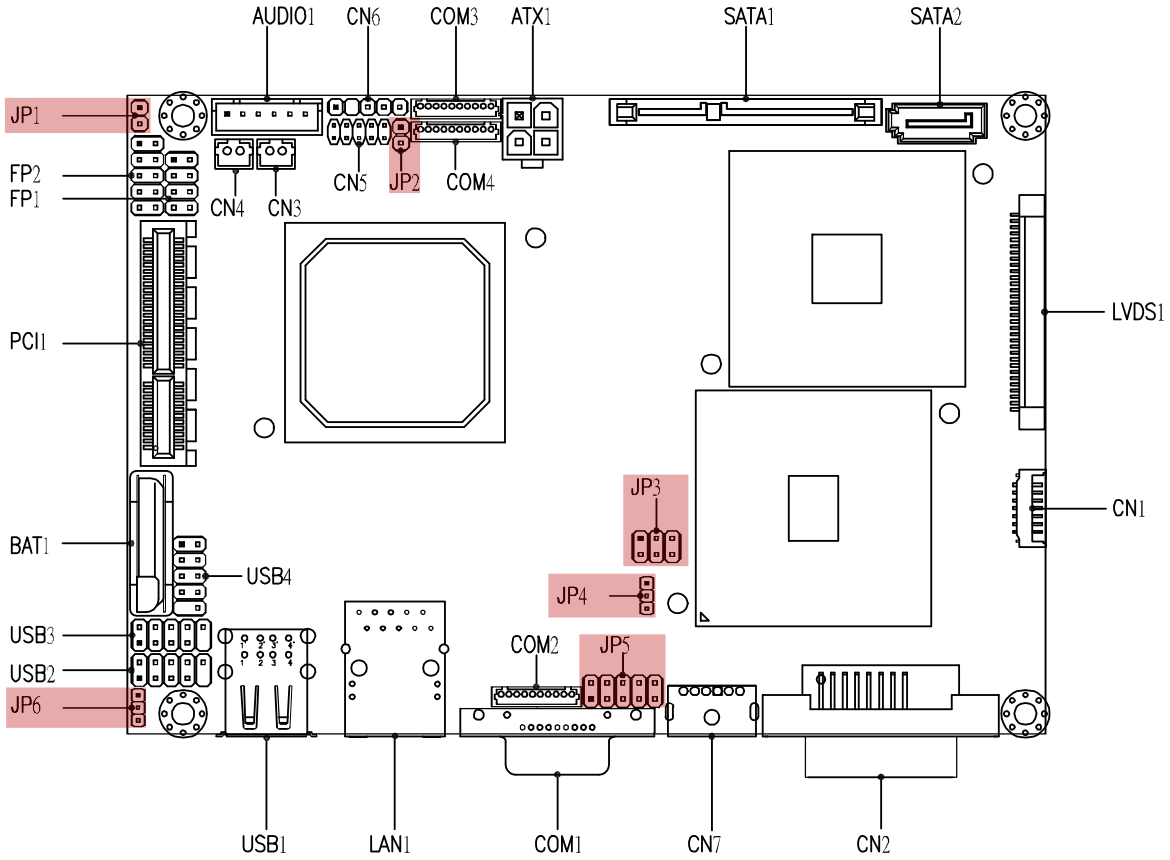
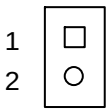


Figure 11 Jumper Locations

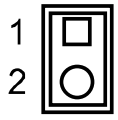
Label	Function
JP1	*Clear CMOS Selection*
JP2	*Power Mode Selection*
JP3	*Backlight & Panel Power Selection*
JP4	*Backlight Enable Selection*
JP5	*KB/MS Connector Selection*
JP6	*USB POWER SELECT*

Table 10 Jumper List



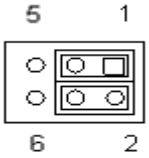
Jumper	Status
Open	Normal Operation (Default)
Short	Clear CMOS

Table 11 JP1 Clear CMOS Selection



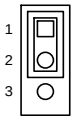
Jumper	Status
Open	AT Mode
Short	ATX Mode (Default)

Table 12 JP2 Power Mode Selection



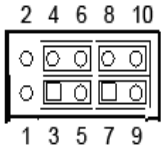
Jumper	Setting	Status
1	1-3	Backlight Power = +12V (Default)
	3-5	Backlight Power = +5V
2	2-4	Panel Power = +3.3V (Default)
	4-6	Panel Power = +5V

Table 13 JP3 Backlight & Panel Power Selection



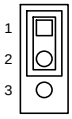
Jumper	Status
1-2	Active High (Default)
2-3	Active Low

Table 14 JP4 Backlight Enable Selection



Pin	Signal	Pin	Signal
1	+5VSB	2	GND
3	KBCLK_SIO	4	KBDAT_ SIO
5	KBCLK_CN7	6	KBDAT_CN7
7	MSCLK_SIO	8	MSDAT_SIO
9	MSCLK_CN7	10	MSDAT_CN7

Table 15 JP5 KB/MS Connector Selection



Jumper	Status
1-2	+5VSB (Default)
2-3	+5V

Table 16 JP6 USB POWER SELECT